Notebook Series -- Notebooks by Edison and Other Experimenters
Recorder and Recording Experiments -- A. M. Kennedy Books
Notebook, N-14-09-21

This notebook was used by Absalom M. Kennedy during September 1914-March 1915 as a daily record of experiments and tests with phonograph recorders and reproducers. The record is continued in N-15-03-17. The tests involve various recording heads, arms, and diaphragms; gaskets; and speaking tubes. Also included are tests of machines to reproduce cylinder records from disc masters. Some of the experimental recorders were sent to the recording studio for testing, with the results reported back to Kennedy. The entries also describe other work by Kennedy, including experiments on film cements and cellulose mixtures for motion pictures, which are related to experiments in N-14-01-01.3 and N-14-01-12, Notebooks by Other Experimenters—Kinetophone and Kinetoscope Experiments. Also mentioned are meetings with Leonard W. McChesney and other employees in regard to "The Birth of the Telephone," a kinetophone film about Alexander Graham Bell. Kennedy's notes often mention Edison's own involvement in the phonograph experiments, including his opinions and suggestions about particular recordings or masters. Other individuals involved in the work include Clarence B. Hayes, William H. Meadowcroft, Walter H. Miller, Sherwood T. (Sam) Moore, William F. Nehr, George J. Werner, and an employee named Finlayson (possibly William F. Finlayson, who worked for Edison in 1903). A two-page note from Kennedy to Miller Reese Hutchison, with Edison marginalia, has been inserted into the book. The front cover is labeled "Daily Record of Recording Experiments" in ink and "A.M. Kennedy" and "Cement" in pencil. The pages are unnumbered, and several pages have been removed from the book. Approximately 140 pages have been used.

Sept. 21, 1914.

Stretched recording diaphragm of Cellulose Acetate + 50% camphor - .0015" thick by wetting with Methyl Alcohol, pulling tight and allowing to dry. Stretch good and tight. Georgio is building up a recorder with this.

Tried another with cellulose acetate diaphragm .0015" thick stretched by wetting with water as suggested by Mr. Edison. The water did not expand the diaphragm sufficient to stretch.

Tried putting diaphragm as above in boiling water. Turned opalescent & translucent and white and stretched on cooling, apparently not as much as by the alcohol method above however.

Made several piano records with stretched diaphragms which

[illegible]

9/21/14 cont'd

George Werner had put up. As piano records these were good but did not exhibit any of the unusual qualities as described by Mr. Edison.

Played for Mr. Edison records showing recording from Disc Sub-Master to Cylinder Master. He said these were good and to go ahead with it, that Hayes would select the records and Moore (?) would furnish special smooth sub-masters if necessary. Showed him also piano records with stretched recorders. He said these were about as good as ordinary recorders would do but not the unusual results he was looking for. To go ahead and get these better results.

Sept. 22, 1914.

Made solution of celluloid film in acetone. Mixed with this a solution of shellac in alcohol. Poured this over a glass plate. Found that on drying the center turned white and in ridges while the edges remained transparent. Probably due to the fact that at the edges both acetone and alcohol evaporated nearly evenly while in the center, on account of slower evaporation, the acetone evaporated first, leaving the alcohol to absorb a little moisture before evaporating and turning both celluloid and shellac white.

Had difficulty in stripping film from glass. Found that by moistening film with alcohol and rubbing over with a dampened rag or by dampening with solution of

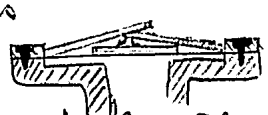
9/27/14

80% alcohol + 20% water. The film easily stripped from the glass.

Made up for George Werner an aluminum ring - 1 1/8" external and 1 1/8" internal diameter x .010" to try and keep his diaphragms from being too sensative.

George Werner made piano tests with several recordings and with D p (pulsowmeter) in Bass got one to show ring of 25 seconds.

Made up diaphragm with two arms



This proved less sensative than with only one arm.

Sept 23 - 1914.

Curious change of tension of diaphragm

Nerner was working on two members, one with .6015" diaphragm stretched by cold - the other stretched by partial solvent alcohol yesterday afternoon & left them on his bench.

On examining them this morning both were loose and flabby. After handling a few minutes the alcohol stretched one tightened up O.K. The other tightened on heating the head.

Evidently both had been stretched to their elastic limit on the warm afternoon previous and were flabby on this cool morning.

It will be necessary to hold room at invariable temperature for these diaphragms to be practical.

9/23/14. contd

Tried dissolving shellac in acetone. Difficult cold. Dissolves hot.

Made mixture hot shellac in acetone solution and added to solution regular celluloid film in acetone. Poured on glass. Center turns white & opaque.

Unsuited for diaphragm purposes. Would probably be a suitable mixture for dead surface varnishes.

Made solution of Acetyl Cellulose Cotton in Chloroform. Dried rapidly but with white patches in center. This film seems to be good and tough. Is not smooth enough however. Will have to make them smooth probably by filtering the solutions and seeing that a level even solution is on the glass plate and that it dries rapidly.

9/23/14.

Made solution of Acetyl Cellulose Cotton in Acetylene tetrachloride. This dries to an exceedingly clear tough film. As before the film is rough and ~~I must~~ learn to make them smooth.

Ran taking pictures for M.P.A. for some people from Mobile.

9/24/14.
Made 6- disc to cylinder records.
3 trials - 3 masters.
Lemulled reproducing machine.

9/28/1.

Made solution of gum sandarac in acetone and added celluloid film. This mixture will not do for diaphragms as it is too brittle to strip from glass readily. It would make a good flat coat varnish as it dries with a good dull finish and on glass is hard and resists rubbing.

Added to this solution small amount of castor oil. Result N. G. Film stays soft & oil tries to separate. Makes a waxy like film.

9/29/14.

Tested out records made 9/24/14.
They proved conclusively
① That the unreproduced record is better than one which has had the master reproduced.
② That the best combination for records made was
Reproducer #1.
Dust Cover #2
Reading Horn #5
Record #2
gave best results.

Made up solution of acetyl cellulose in acetylene tetrachloride and of gum sandarac in acetylene tetrachloride.

Got two pieces of polished plate glass about 20"x20"x1½" & levelled one of them. Poured following solutions to produce films for trial.
① Acetyl Cellulose in acetylene tetrachloride
② Same with addition of equal amount of solution gum sandarac

in acetylene tetrachloride.

Tried out new stretched-diaphragm with Geo. Werner. Results seem to be good on piano.

RECORD FOR W.E.CO.
BY MR. HUTCHISON.

Made record of reading from book by Mr. Hutchison for Telephone reproduction by the Kinetophone. Made two trials on machine.

① Reader #10
Horn #3

② Reader #10
Horn - regular Kinetophone Recording.

11/4/14.

Experiment quality of records using -

① Reproducer #1
Discstorm #

Experiments on
Film Cements

#1 Equal parts of Methyl Alcohol, Amyl Acetate, Benzole and Acetone with about 15% Camphor.

#1 Sent to Recording Dept.

#2 Sent to Recording Dept. 7/5/15
Tested 8/10/15 with 1 meter Horn close to piano for hearing. Big, natural tone. Needs single notes more but goes to pieces in low cords.

Mark owner see Peters 7/7/14

#3 Sent to Recording Dept.

12/8/12.

Stretched Diaphragm
Recorder Heads sent to
Recording Dept.

#1 - 2" diam
Diaphragm .001" of pure acetyl cellulose, dried from acetylene tetrachloride. Stretched by freezing.

#2 - 2" diam.
Diaphragm .001" of pure acetyl cellulose, dried from acetylene tetrachloride. Stretched by soaking with 75% methyl alcohol + 25% water & allowing to dry.

#3 - 2" diam.
Diaphragm .003" of pure acetyl cellulose, dried from acetylene tetrachloride. Stretched by freezing.

#4 Sent to Recording Dept

#5 Sent to Recording Dept

#6 Sent to Recording Dept.

#4 - 2" diam.
Diaphragm .0014 of pure acetyl cellulose dried from acetylene tetrachloride. Stretched by freezing

#5 - 2" diam -
Diaphragm .001 of pure acetyl cellulose dried from $C_2H_2Cl_4$. Stretched by freezing.

#6 - 2" diam.
Diaphragm 00125 of pure acetyl cellulose dried from $C_2H_2Cl_4$. Stretched by freezing.

Made over 2/17/15 See Patrick

#4A - Set up with 7/8" domed aluminum center .006", regular arm, .038" sapphire, flat ball.

Given, Gilmore 2/5/15 - Tested 2/10/15 - Kineto. Horn close to piano. Letter buried. Hard to single notes & high cords, blasts on low cords. Quality very good.

Made over 2/17/15 See Patrick

#10 - Sets up with 7/8 domed aluminum center, .004" - flattened arm, .038" sapphire, flat ball.

Given to Gilmore 2/5/15. Sounds too full & tubby - not clear - does not differentiate notes. Tested 2/10/15 - Same as above but not quite so good on backing & quality as 4A.

Recorders Made and Kept.

Made over 2/17/15 See Patrick

#4A - Diaphragm of cellulose acetate .001" - dried from $C_2H_2Cl_4$ solution. Stretched by freezing with CO_2. With 7/8" aluminum domed center. Stretched on 2" head. .038" sapphire, set standard.

Made over 2/17/15 See Patrick

#10 - Diaphragm of cellulose acetate .0015" - dried from $C_2H_2Cl_4$ sol. 2" Head. Stretched by freezing with CO_2. Use 7/8" aluminum domed center. .038" sapphire set standard except flattened arm.

#12 - Diaphragm of cellulose acetate .0015" - dried from $C_2H_2Cl_4$ sol. 2" Head. Stretched by freezing with mixture equal parts CH_3OH & H_2O allowing to dry. Used 7/8" aluminum center domed. .038" sapphire set standard.

#24 - Dit up with 13/16 domed center, .004" aluminum. Flattened arm, .038" sapphire.

#3 _____

Broken see later

#20 _____

Broken see later

#2 _____ Sent to Aldin Dt Studio

Made other 5/18/61

#2A - 2" head. Diaphragm .001" thick of cellulose acetate dried from solution in $C_2H_2Cl_4$. Stretched by wetting with equal parts CH_3OH + H_2O & drying out. 7/8" domed aluminum center put on - .038" needle in flattened arm. (Did not have failed hall to complete).

#3 - 2" head. Diaphragm .0035" thick of cellulose acetate + 30% gum dandarac dissolved in $C_2H_2Cl_4$. Stretched by wetting with 1 part $(CH_3)_2CO$ + 2 parts H_2O and drying out.

#20 - 2" head. Diaphragm .003" thick of cellulose nitrate dried from amyl acetate solution, stretched by wetting with equal parts CH_3OH + H_2O.

#21 - Same as above except stretched by wetting with solution 1 part $(CH_3)_2CO$ + 2 parts H_2O.

Made over 5/18/61

Experiments with Cellulose Mixtures.

(1) Tried to dissolve Gum Dammar in $C_2H_2Cl_4$. Will dissolve, but slowly by heating. Used 50% of this with 50% heavy solution of cellulose acetate in $C_2H_2Cl_4$.

Film unsatisfactory. Need stretch & bend slowly when warm (about 70°F) but even at this temperature scored crack when quickly bent. When cooled to about 40°F moved crack very easily.

(2) Film made as above but with about 5% gum dammar solution. Dried with "flat" - no glass surface.

Better than (1) but still feels soft & stuchy to touch. Do not think will prove satisfactory.

(3) Tried to dissolve Gum Dammar in $C_2H_2Cl_4$. Very difficult even when hot. Made mixture of

such solution, estimated at 5% gum with 95% solution cellulose acetate in $C_2H_2Cl_4$. Film from this looks promising. It cracks a little more than pure cellulose acetate when suddenly bent but is hard & springy. Set up #3 Recorder head with this.
Makes good flat surface varnish

(4) Tried to dissolve Gum Dandarac in Amyl Acetate. Dissolves in any quantity but rather slowly. Made solution 50% above with 50% celluloid film in Amyl Acetate. Gave an "aligatored" surface film, a little flat but which film adhered to the glass plate so strongly that it was difficult to remove even after softening with acetone & water. Film also turned white in spots while stripping. Does not look good for diaphragm purposes.

(5) Dissolved celluloid film in Amyl Acetate. Dries with slight ridges from glass plate but

looks good for diaphragm purposes.
Strips easily.

#20 - Sent to Alden St. Studio. Werner reports that disc record was made with this in comparison with regular records, but that master was broken in 24 hrs. No master. Approved by Mr. Edison

#3 -

Destroy Memorandum
2/5/15
Journal Laboratory
Resolution See letter

#41 - Sent to Alden St. Studio

Made over 2/19/15

Recorders 1/4/15

#20 - 2" head. Diaphragm .003 thick of celluloid film from solution in Amyl Acetate. Stretched by swelling with 2 parts H_2O to 1 part $(CH_3)_2CO$.

#3 - 2" head. Diaphragm .001" thick of celluloid film dried from solution in Amyl Acetate. Stretched by oiling head where touches diaphragm & wetting diaphragm with 2 parts $(CH_3)_2CO$ + 3 parts H_2O

#41 - 2" head. Diaphragm .001" thick of celluloid film dried from solution in Amyl Acetate. Stretched by oiling head where touches diaphragm & wetting diaphragm with 2 parts $(CH_3)_2CO$ + 3 parts H_2O & stretching when wet and allowing to dry.

Made over 2/19/15

C43

Make sure 8/17/15 See Peter

#19 Set up with 13/16 flat dome .006" thick aluminum, regular arm, ~~.038"~~ sapphire, .125 cup. wax & resin used + faolen.
Tests with too fine & tubby & little elasticity. Definition not clear.

#20 - Sent to Alden for Studio

Make sure 8/17/15 See Peter.

#12 - Regular 2" recorder head. Diaphragm .001" of regular film stock dried from solution in amyl acetate. Stretched by wetting with 5 parts H_2O + 1 part $(CH_3)_2CO$ & pulled tight and allowed to dry. Seems good and tight. - SET - UP -

#22 - Regular 2" recorder head. Diaphragm .002" of regular film stock dried from solution in amyl acetate. Stretched by wetting with equal parts H_2O + NH_3OH & pulled tight and allowed to dry. Seems good & tight.

Experiment in Recording

① Mr. Edison wished to experiment on recording particularly for grand opera records and especially for those with more than one voice.

In former records he detected that the singers do not keep together either in time or pitch and assigned as a reason that each one heard the other and if the second one was off - even slightly in time or pitch, the first followed him and the result be more or less confusion. He therefore tried an experiment in which singing regularly he detected "beats" in tuns" and in these voices due to their not being in exactly the same pitch. He then had one of the voices sing in a horn which ear tuned to the other "voices" ears. In this way the "beats" were eliminated.

He suggested that the same result may be accomplished with telephones in which a leader sings into a transmitter and the recording voices had receivers on their ears.

At first the telephones were so loud as to be annoying to the singers. When they were reduced in loudness, the singers still complained that they were confusing even though they could not hear distinctly. This was deemed a failure on account of the telephones not being clear enough.

Speaking tubes were then rigged up so that a leader could sing in a horn and be followed by the recording singers.

On trial with out these tubes contrasted with a trial with the tubes, the latter was found to hold the singers together better in time (two trials), the record showing crisper, cleaner, snappier, and that the sound directly in

Their ears without outside interference held them together better.

Another experiment was tried at the same time in which the ear tubes were attached to a reproducer on disc phonograph on which was a semi-instrumental record of Quartette from Rigoletto. This proved confusing to the singers and the record deemed a failure.

#23 Sent to Recording Studio
1/27/15

Remade 2/6/15 See later

Rough Cut and too fine tone"
(Rec. Studio)
2/9/15

#24 Sent to Recording Studio
1/29/15

"Weak-cut fair cut"
(Rec. Studio)
2/9/15

#25 Sent to Recording Studio
1/29/15.

"Too fine - Rough Cut"
(Rec. Studio)
2/9/15

Destroyed & made over with heater diaphragm. see later

1/27/15.

#23 - Head 1 3/4" external x 1 1/4" internal Diameter. With film of nitro cellulose .003" thick, dried from solution of amyl acetate, stretched by ~~clamping~~ mixing equal parts $(CH_3)_2CO$ & H_2O.

Sent Rec. Studio 1/27/15

#24 - Head 1 3/4" external x 1 1/4" internal diameter. With film of celluloid - (found) .005" thick. Stretched by wetting with equal parts $(CH_3)_2CO$ and H_2O, pulling tight, clamping, and allowing to dry.

Sent Rec. Studio 1/29/15

#25 - Head, aluminum, 2" external, 1 1/4" internal diameter. Film of nitro cellulose (film stock) dried from solution in amyl acetate, .002" thick. Stretched by wetting with equal parts H_2O, $(CH_3)_2CO$, pulling tight, clamping and allowing to dry.

Sent Rec. Studio 1/29/15.

#26 Sent to Recording Studio
1/29/15

"Too full - Rough Cut"
(Rec. Studio)
2/9/15.

Made over 2/10/15. (See later)

#27 Queen Geo Werner 2/5/15
Tested 2/10/15 with Knots Horn close to piano on holding test. Holds single note. Blasts on cords. Fair quality.

#28 Queen Geo Werner 2/5/15
Tested 2/10/15 with Knots Horn close to piano on holding test. Not so good as 27 above on holding or on quality.

Made over 2/16/15 See later

#26 - Aluminum head - 2" external - 1/4" internal diameter. Diaphragm of film stock dissolved in Amyl Acetate ~~or~~ Butyl Acetate - .002" thick. Put on by wetting with equal part $(CH_3)_2CO$ & H_2O, stretching, clamping and allowing to dry.

Sent Rec. Studio 1/29/15

2/1/15

#27 - Brass Head - 2" external, 1½" internal diameter. Diaphragm of film stock dissolved in Amyl Acetate and dried - .002" thick. Tightened by wetting with equal parts $(CH_3)_2CO$ & H_2O, stretching, clamping and allowing to dry.

#28 - Brass Head - 2" external, 1½" internal diameter. Diaphragm of film stock dissolved in Amyl Acetate + 2% acetone & dried .002" thick. Tightened by wetting with equal parts $(CH_3)_2CO$ & H_2O & stretching, clamping & allowing to dry.

1/28/15.

Made up same four ear tubes connected to longer brass tube to be more convenient for the singers.

Hayes made up quartette consisting of Miss Reneen, Miss Tales, Mr. Meadowcroft and himself with Miss Dingwd at the Piano.

Made trial of "Gloria" without and with the above tubes.

The records in both cases were poor, whether the fault was due to the singers or the recording, could not determine. The result was not conclusive although as shown on former trial it seemed that this quartette kept better time - but is kept together better with the tubes than without.

Tried "at the Mill Maggie" with similar results. - Record did not show up as good as previous record made of same quartette singing "Rigoletto". Result as before - inconclusive.

Made solo record of Miss A. Reneen singing from "Traviata".

Record good. This little girl of about 8 has a good clear even voice, good interpretation, and puts life into her song. She will probably develop into a good singer and actress.

Am not satisfied with the recording work which has been done. Think that part of our trouble at least was with the technical recording. Will try and have recorders and machine & horns up and in good shape before the next record is taken.

#29 -

Warped while being
cut up, See later

#30, ~~Queen Geo Werner~~ 2/5/15
Tested 2/10/15 with Knecht from above
Soprano for Locking - Sounds
dead. Does not carry ring of
piano. Werner stated quality fair

2/3/15.

#29 - Regular Brass Head, 2" External,
1½" internal diameters,
Diaphragm stock celluloid (found)
.005" Thick, Stretched by wetting
with equal parts $(CH_3)_2CO \times H_2O$,
allowing to swell, tightening,
clamping & allowing to dry.

See opposite

#30 - Regular Brass Head - 2" External,
1½" Internal Diameters.
Diaphragm, celluloid acetate
dried from solution in
acetylene tetrachloride, .0025"
thick. Tightened by wetting
with equal parts $(CH_3)_2CO \times H_2O$,
allowing this to soften film,
stretching, clamping & allowing
to dry & tighten.

Made over 7/17/14 See Letter

#29
Set up (ANK) with $\frac{13}{16}$ aluminum dome .006 - regular arm - .038" x .125" sapphire, flat top follow ball - (2/3/15).
Guem Geo Manner 9/5/15

Made over 7/17/14 See letter

#29 - Regular 2" Brass Head
2" External - 1½" Internal Diameters.
Diaphragm of Clock celuloid (found) .005" thick. Stretched by freezing head with CO_2 - clamping and allowing head to expand on warming.

2/5/15.

As Mr. Meadowcroft complained last time that the leader did not sound loud enough through the tubes, had larger tubing between cross member and ear tubes proper.

Had Misses Renoen (Soprano) Yates (Alto) and Ingrid (Pianist) with Hayes to sing trio of "Carmena".

Had trouble with recording and reproducing machines at first.

Made 5 trials of Carmena without tubes until we got a fairly good one.

Tried tube system, Miss Ingrid singing soprano in Invoness phono tube horn as leader.

Result showed that trio kept together OK as to time but the soprano was badly off on pitch - about 1/2 tone flat.

Next gave Miss Ingrid another horn, called Japanned Invoness. Result better than before but still off pitch.

Then had Miss Ingrid play the air as well as accompaniment

on the piano fixing horn so this moved just as readily. Result better than former but still not so good as without tubes, as regards pitch. In tempo however they seemed to stay together better with the tubes than without.

Will try pads on tubes and telephones next time.

Remade 7/15/15 See letter.

#3 Given to Hayes 2/9/15. Tested Oct 2/10/15. Gives a record which is thin & sharp. CONTRAST WITH FORMER reports. Punctured in reassembly.

7/9/15

#3 - Regular Brass Head, 2" external, 1½" internal diameters. Diaphragm of white celluloid, purchased from The Celluloid Co of Newark, .0055" thick. Stretched by fusing the head and at the same time blowing on the diaphragm to heat and moisten it.
(Stretched Very Tight)

2/9/15.

Had Tinlayson make up new master reproducer for Hayes. First one made with counterweight did not track well. Changed it by cutting the weight in half and adding 1/8" to the short end of the regular disc lever. Also put a .040" ball in place of the diamond. Hayes says it reproduces fine.

Fixed up telephones with induction coil for test of quartette tomorrow

Attempted to make Ear Pads to fit the ear tubes. These could be made to fit but were not sound proof. It seems a very difficult job to make sound proof ear pads.

Made up #3 Recorder; gave to Hayes to Test Out. See previous page.

8/10/15.

Got Werner & Hayes out and tested out stretched pianoforte for hooding with the following results:

A - Feel. Unnatural. Not very sensative.

2 - Big Tone. Holds well on single low bass notes. Focus all pressure on hand feel of cords.

28 - Thinner than # 2 and doesn't hold as well.

27 - Holds single notes well. Blasts on cords.

HA - Good quality on high notes. Blasts on low strong cords.

10- Good quality on high & single notes. Blasts on cords. Found that the needle was loose & tightened. Results held better.

112- Blasts both on single notes and on cords. Good quality on high notes.

#30 - Soft - lusterless. Holds single notes & high cords. Blasts only on low cords. Fair quality.

#29 - Dome loose from diaphragm.

In previous test, Cinelophone recording horn was used close in open grand piano.

Voted out #'s 4A & 10 with small horn.

#10 Sounds rather flat & dead. Does not carry the tone of the piano. Verner pronounced fair quality.

#44. Quality pretty good.
Not very loud.

afternoon

Misses Rensen, Fates and Ingred came out.

Tested Misses Rensen (Soprano) Fates, (Alto) & Hayes (Tenor) singing Quinata. Made good record without telephone.

Used head telephones connected to M.E. transmitter through induction coil on singers. Miss R said that the telephones were less annoying than ear tubes.

Records with telephones (3) showed distinctly more in pitch than the records without. In time they were perhaps a little closer together with than without telephones.

These results were confirmed by Chas. Edison.

Made tests of before mentioned singers singing arpeggios & scales without telephones.

They kept better together in pitch without than with the tubes. This was confirmed by Chas. Edison.

Tested #4A & 10 Recorders with voice recording. #4A was slightly buried. Excellent quality. #10 had squeaks, was more buried and not so good.

2/11/15

With Demonstrators all day

2/12/15

With Demonstrators all day

2/13/15

Correct Examination Papers.

2/15/15

Write Report

Made up acetyl cellulose solution with 90% acetyl tetrachloride, 10% acetone & flowed on glass for film. Turned up hot air space for heating film when stretching. Stretched recorder #25 of .0025" acetyl cellulose, heated. Stretches very tight.

#25 - Given Recording Dept. 2/17/15.

3 - Given N. Hayes 2/17/15 to set up.

Tested out 2/23/15. "Not as loud as standard. - Blasts slightly on loud chords - Quality sharper than H A.

2/15/15

#25 - Aluminum head 2" external, 1¾" internal diameters. Diaphragm of cellulose acetate from acetylene tetrachloride, .0025" thick. Stretched by applying heated piece of brass to diaphragm, pulling tight & clamping. Seems to stretch very tight in this way.

2/16/15

3 - Brass head - 2" external, 1½" internal diameters. Diaphragm of white stock celluloid, purchased from The Celluloid Co originally .0055" thick. Rubbed down with sand paper to .0045" thick. Stretched by laying piece of brass heated to about 200° F on it, pulling tight and clamping. Seems very tight.

2/16/15

2/10/15.

Stripped film of yesterday. Strips easily by softening with mixture acetone & water. Curled through. Corrected this by wetting with same solution on reverse side.

Made solution of acetyl cellulose in acetylene tetrachloride 80% and amyl acetate 20%. This makes a clearer and more perfect solution than acetylene tetrachloride alone as all of the cotton seems to dissolve in it while strings of undissolved cotton almost always remain in acetylene tetrachloride alone. Added too much cotton so that solution was too thick & tried addition of about 10% acetone and afterwards 10% C_6H_6 to solution. The cotton would not dissolve in this solution and mixture was thrown away.

Made new mixture of 21 parts Acetylene tetrachloride and 4 parts Amyl Acetate. Added acetyl cellulose to this and heated over radiator.

Heated above, strained & poured on glass for film. Seems rather thin. Finished day stretching Reeders.

2/17/14.

Stripped film made yesterday and dried overnight. Is too thin.

Packed recorders made to be sent to Mr. Muller and to Werner.

Had Ruhr make new punch and some longer fellow ball arm screws for Hayes.

Saw about Demonstrators working. Stitched diaphragms in new recorders.

Made up solution of acetyl cellulose in $C_2H_2Cl_4$ - heated & strained - cleaned glass & poured.

#26 - Green Recording Dept. 2/17/15

#23 Green Recording Dept. 2/17/15

#24 Green Recording Dept 2/17/14.

2/16/15.

#26 - Aluminum head - 2" external, 1¼" internal diameters. Diaphragm of old Cellulose Acetate film, left by Pierman, .004" thick. Stretched by laying on brass heated to about 212°, stretching tight, clamping and allowing to cool. Seems good and tight.

#23 - Brass head - 1¾" external, 1¼" internal diameters. Diaphragm of old material, left by Pierman & marked "½ camphor" (other cellulose acetate from burning test) - .0035" thick. Stretched by laying on cylinder of brass, heated to about 212° F - stretching tight, clamping and allowing to cool. Seems good and tight.

#24 - Same as #23 except diaphragm .004" thick.

[287]

#28.- Given N. Hayes 8/17/15 with arm etc. complete.
Tested 8/22/15 - pot test "Nearly equal - weaker than standard" - Quality Fair.
Md Test - "Not sensative" - "Damped notes".

Made over 8/1/15

#2 - Given Geo Werner 8/17/15 with arm etc complete.
Tested 8/22/15. "Little weaker than standard - Blasts on low chords - Fair quality".

Made over 8/1/15

8/10/15

#28 - Brass Head - 2" external - 1½" internal diameters. Diaphragm of old material left by Pierman, according to pile & burning consists of cellulose acetate & camphor .004" thick. Stretched by putting on cylinder of brass heated just above 212°, tightening & clamping. Seems good and tight.

Made over 8/1/15

8/17/15

#2 - Brass Head - 2" external - 1½" internal diameters. Diaphragm of cellulose acetate from solution in $C_2H_2Cl_4$ .003" thick. Stretched by laying on heated brass cylinder, about 212° - tightening & clamping. Seems good & tight.

Made over 8/1/15

#29 Given Geo Perner 2/17/15
Tested 2/23/15 "Weak - Holds well - Quality not good."

Made over 2/24/15

#10 Given Geo Perner 2/17/15

#2A Given Geo Perner 2/17/15

2/17/15

#29 - Brass Head - 2" External, 1½" Internal diameters. Diaphragm of cellulose acetate from solution in $C_2H_2Cl_4$, .003". Stretched by applying cylinder of brass heated just above 212°, pulling tight & clamping. Seems good & tight.

Made over 2/24/15

#10 - Brass Head - 2" External, 1½" Internal diameters. Diaphragm (old some of Permanio). Tests show cellulose acetate with probable camphor. .0035" Stretched by applying cylinder of brass heated above 212°, pulling tight and clamping. Seems good and tight.

#2A - Brass Head - 2" External, 1½ Internal diameters. Diaphragm of Cellulose Acetate from solution in $C_2H_2Cl_4$. .0025", Stretched by applying heated cylinder of brass, above 212°, pulling tight & clamping. Seems to be good and tight.

C913

#31. Given Geo Werner 8/17/15
Tested 8/23/15. "Blasts on lower chords - Weaker than standard - Quality fair."

Made over 8/1/15

#12. Given Geo Werner 8/17/15
Tested 8/23/15. "Sensative - Blasts on lower chords - Quality good".
2d test - "Quality not as good as 4A".

Made over 8/27/15 See later

#30. Given Geo Werner 8/18/15
Tested 8/23/15. "Blasts on lower chords - little weaker than standard - Quality better than #31 - Clean".
2d test. "Excellent Quality - Distinguishes notes better than #4A - Stands out pretty good".

Made over 8/24/15

8/17/15
#31 - Brass Head - 2" External, 1½" Internal diameters. Diaphragm of cellulose acetate from sol. in $C_2H_2Cl_4$ - .0023". Stretched by applying brass cylinder heated above 212°, pulling tight & clamping. Seems good & tight

Made over 8/1/15

#12 - Brass Head - 2" External - 1½" Internal diameters. Diaphragm of cellulose acetate from solution in $C_2H_2Cl_4$ .002". Stretched by applying brass cylinder heated above 212°, pulling tight and clamping. Seems good & tight.

Made over 8/27/15

#30 - Brass Head - 2" External - 1½" Internal diameters. Diaphragm of cellulose acetate from solution in $C_2H_2Cl_4$ .0015". Stretched by applying brass cylinder heated above 212°, pulling tight and clamping. Seems good and tight.

Made over 8/24/15

Given Geo Werner 2/18/15

#4A - Tested 2/23/15 "Fairly loud - Clear - Blasts only slightly on low chords - Quality good - clear.

2d test - "Good quality - Stands out well - brighter."

3d test - Fairly loud - full - good

#27 Given Geo Werner 2/18/15

Made over 2/1/15

Tested 2/23/15 - "not as loud as standard - Blasts slightly on low chords - Quality fair - full".

2/17/15

#4A - Brass Head - 2" External - 1½" Internal Diameters. Diaphragm of (.002") Cellulose Acetate from solution in $C_2H_2Cl_4$. Stretched by applying brass cylinder heated above 212° pulling tight and clamping. Seems good and tight.

#27 2/18/15

Made over 2/1/15

Brass Head - 2" External - 1½" Internal Diameters. Diaphragm of cellulose acetate from solution in $C_2H_2Cl_4$, .002".

Stretched by applying cylinder of brass heated above 212°, pulling tight, clamping. Seems good & tight.

2/18/15.

Stripped film poured last afternoon. Seems O.K.

Saw about demonstrations. Greer not arrived at 10 a.m. Stinson only one to teach. This looks useless to take time on one.

Saw Werner about tests of recorders. Got Recorders from Werner.

Made records of Vernon Dalhart's voice. This man is nice and even but rather sharp of voice.

Taught Stinson for Dese Demonstration rest of afternoon.

2/19/15.

Taught Stinson part of morning.
Stretched Recorders.
Misses Rensen, Yates & Emgrud -
Messrs. Duesinger (Violin) Boyle
(Tenor) came up for recording
experiment.

Tried Juanita, first regular,
second with telephones & led by
violin. Results inconclusive. Will
put up to Mr. Edison to decide.
Made another set, third regular,
fourth, with telephones led by
violin. Results again not conclusive.
In these singers were Miss Rensen
soprano, Miss Yates, alto, Hayes
Tenor, Miss Emgrud, Piano, Mr.
Duesinger - Violin.

Made a fourth record "Carmena"
as above, regular, but with Boyle
as Tenor and Hayes as Bass.

Will put results up to Mr. Edison
to get instructions for next
moon.

#21. Queen Geo Nemer 2/19/15.

#41 Queen Hayes 2/19/15.

2/19/15

#21 — Regular Brass Head 2" ex. - 1½" Int. Diameters. Diaphragm of cellulose acetate from solution in $C_2H_2Cl_2$ .002". Stretched by applying brass cylinder heated above 212°, pulling and clamping. Seems not to have been pulled as tight as former ones and is not so tight. TRY & SEE EFFECT.

2/19/15

#41 - Regular Brass Head - 2" ex. - 1½" Int. Diameters. Diaphragm of Cellulose acetate from solution in $C_2H_2Cl_2$ .001" Stretched by applying brass cylinder heated to 212°, pulling tight & clamping. Seems good and tight

2/20/15.

Got books, papers etc. from studio — Straightened them up. Got rid of accumulated memos etc.

Saw Walter Miller on stretched diaphragms. He reports that piano record reported as good was made with stretched diaphragm.

Made up double quantity of acetyl cellulose in 8 oz/ $C_2H_2Cl_4$ + 4 oz $(CH_3)_2CO$ & poured for film.

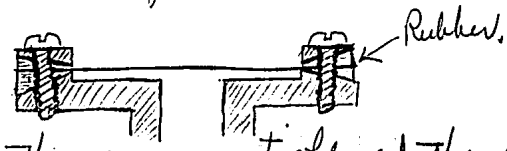
9/00/15.

Took charge of new class of Disc Demonstrations.

Repat.

Saw Werner about testing out stretched diaphragms.

Suggestion for stretched recorder.



As the screws are tightened the rubber gaskets will first seize the diaphragm in cone shape and then cause it to be forced outward and stretch the diaphragm.

Stretched diaphragm in recorder #32.

MR says try this

#32 Delivered to Geo Werner 7/20/15.

Film created by accidentally bringing set up.

Made over 8/24/15

7/22/15.

#32 - Brass Head - 2" External - 1½" Internal Diameters. Film of cellulose acetate from solution in 90% CH_2Cl_2 + 10% $(CH_3)_2CO$. .002". Stretched by applying heated cylinder of brass, pulling tight and clamping. Seems good and tight.

9/23/15.

Stripped film of last night
Looked after Demonstrators.
Tested out the following recordings
which had been set up by Geo Merrow:

Used Cuulophone Horn in
Grand Piano with top raised.
Test for holding. Using
Db deep bass 3 times followed
by ascending chords of Db, struck
fairly loud.

Cylinder #1.

#74 - Standard - Good quality -
Blasts only on low chords.

9 - Lente weaker than #74. Blasts
on low chords - Fair quality.

28 - Aeolo mel. Weaker than Standard
Quality very fine

Cylinder #2.

#31 - Blasts on low chords. Weaker than standard. Quality Fair.

#30 - Blasts on low chords. Quite weaker than standard. Quality better than #31 - Clear & crisp -

Cylinder #3.

#27 - Not as loud as standard. Blasts slightly on low chords. Quality fair. - Full.

#4A - Fairly loud - Clear - Blasts only very slightly on low notes. Quality good and clear.

#3 - Not as loud as standard. Blasts slightly on low chords. Quality sharper than 4A

Cylinder #4.

#19 - Sensative - Blasts on low chords - quality good.

#79 - Weak - Holds well - Quality not good.

#75 - Big tone - Blends on low chords

Cylinder #5.
Made by playing piano regular - Chopin's Nocturne in Eb - regular strength -

#74 (Standard) Loud - but individual notes damped down.

#78 - Weak - individual notes damped -

#4A - Fairly loud - full - good.

Cylinder #6
Piano pure, a little louder than #5

#4A - Good quality - Stands out well - bright

#19 - Quality not so good as LA

#30 Excellent quality - Makes individual notes stand out.

Turned up dies for and made domes all afternoon - 1/2" - 5/8" & 7/8".

8/24/15.

Made our #29 Recorder.
Saw about Aus & Demonstrators.
Found nails in #29 as previously used had very bad place on cutting edge & turned it

C1175

#29 - Tested 8/6/15. Tone - Runs low chords together - Quality fair

#32 - Tested 8/6/15 Needs fine. Tone a little sharper than standard. Good definition. Range

#3 - Tested 8/6/15 - Sharper than standard. Rather dead - runs notes together.

8/24/15.

#29 - Regular head 2" External - 1½" Internal Diameters. Film .002" of cellulose acetate from solution of $C_2H_2Cl_4$. Stretched by applying heated cylinder of brass, just above 212° - pulling tight and clamping. Set up with dome 5/8" x .004" aluminum regular arm & .038 sapphire

#32 - Regular head - 2" External - 1½" Internal Diameters. Film .003" of cellulose acetate from solution of $C_2H_2Cl_4$. Stretched by applying heated cylinder of brass just above 212° - pulling ~~tight~~ tight & clamping. Set up with dome 5/8" x .004" aluminum, regular arm .038 sapphire

#3 Same as before but set up with dome 5/8" x .006" aluminum, regular arm & .038 sapphire.

C119J

2/25/15

With Dua Demonstrations all day.

C1213

9/26/10

Neth Dear Demonstrations are morning.

Mrs. Rennie, Inquired, Talks ent.

Practiced on Quartette from Rigoletto.

Made Records of Quartette from Rigoletto.

#1 Romano leading
#2 Romano leading
#3 No leader.

Gave Lulu sketch for Reader Reader, adjustable.

Mrs Hammond - who authorized taking Dear Phono to 5th Cong Pres. Church Newark, October.

8/27/15.
Examination of Disc Demonstration
all day.

#17 - Tested 3/6/15. Blows badly - Rotten - way back - dead

~~#27~~ Tested 3/6/15 - Back in horn - muffled - weak x runs - Bogdan.

3/27/15

#17 - Brass head - 2" External - 1½" Internal diameters. Diaphragm (same as #17 - 3/17/15) of cellulose acetate from solution in $C_2H_2Cl_4$ - .004" thick. Stretched by applying brass cylinder heated above 212°, pulling tight & clamping. Seems good and tight. Set up with 5/8" x .006" aluminum dome, regular arm x .038" x .125" needle

3/1/15

#27 - Brass head - 2" External - 1½" Internal diameters. Diaphragm of Acetyl Cellulose from solution in $C_2H_2Cl_4$ .0025" thick. Stretched by applying brass cylinder heated above 212°, pulling tight and clamping. Seems good and tight. Set up with 5/8" x .006. aluminum dome, regular arm x .038" x .125" sapphire

#10 - Tested 3/6/15. Blasts badly - Rotten - away back - dead

#27
Tested 3/6/15 - Back in horn - Muffled - weak x pumps together.

3/27/15

#12 - Brass head - 2" External - 1½" Internal diameters. Diaphragm (same as #12 - 3/17/15) of cellulose acetate from solution in $C_2H_2Cl_2$ - .004" thick. Stretched by applying brass cylinder heated above 212°, pulling tight & clamping. Seems good and tight. Set up with 5/8" x .006" aluminum dome, regular arm & .038" x .125" needle

3/1/15

#27 - Brass head - 2" External - 1½" Internal diameters. Diaphragm of Acetyl Cellulose from solution in $C_2H_2Cl_4$ .0025" thick. Stretched by applying brass cylinder heated above 212°, pulling tight and clamping. Seems good and tight. Set up with 5/8" x .006. aluminum dome, regular arm .038" x .125" sapphire

#2 - Tested 3/2/15
Blasts slightly on low chord - 3 piece. Quality fair

#31 - Tested 3/6/15

Blasts from parts touching - Natural quality - but back in horn - high notes plunky -

Later (reeds raised) Blasts only on lower notes. Quality natural but back in horn - does not stand out, high notes plunky like banjo.

3/1/15

#2 - Bracco head. 2" External - 1½" Internal diameters. Diaphragm (Same as 2/16/15) of acetyl cellulose from solution $C_2H_2Cl_4$ .003" thick. Stretched by laying on bracco-cylinder heated above 212°, tightening & clamping. Seems good & tight. Set up with dome 5/8 x .006" aluminum, regular arm - .038 x .125" sapphire.

#31 - Bracco head - 2" External - 1½" Internal Diameters. Diaphragm (same as 2/17/15) of cellulose acetate from solution of $C_2H_2Cl_4$ - .0023". Stretched by applying Bracco cylinder heated above 212°, pulling tight & clamping. Seems good and tight. Set up with aluminum dome 5/8" x .006" - sapphire .038" x .125" - regular arm.

C1293

Tested 3/6/15 – Needs wind – tone more fine than 32 – does not ping quite so much but tone is natural – little plunky – louder than 74 (Standard)

Tested 3/3/15
Quality fair.
Does not blast with Larno 9 & 10.
Somewhat muffled and like other acetyl cellulose recorders lacks definition.

Tested 3/6/15
Needs fine – single notes – blasts on low chords – quality little plunky – fair.

3/1/15

#28. Brass head. 2" External. 1½" Internal diameters. Diaphragm (Same as 2/10/15) of old material, left by Perman probably cellulose acetate & camphor .004" Thick. Stretched by putting on brass cylinder, heated above 212°, tightening & clamping. Seems good and tight. Set up with aluminum dome 5/8" × .006" – Regular arm – sapphire .038" × .125"

3/2/15

#33. Special adjustable head as 3/27/15, with triangular rubber gaskets. With diaphragm of cellulose acetate from solution in $C_2H_2Cl_4$ – .0025" Thick. Stretched by tightening screws of clamping ring. Seems good & tight.
Set up with aluminum dome 5/8" × .006" – regular arm, sapphire .038" × .125".

8/1/15.
Set up recorders as shown.
Graded examination papers.
Put diaphragm in & rubber gasket
adjustable stretched reader

3/8/15.

Finished grading Diamond Disc Examination papers.

Set up adjustable recorder & tested out on piano recording with horns 10 & 9 respectively.

This recorder seems to hold piano with both horns when close in even on heavy chords.

Tightening up the diaphragm does not seem to change its characteristics.

8/3/15.

Tested out #38 Recorder. This gives much piano fair quality but is still somewhat muffled and lacks definition.

Made up new domes and arms.

Looked over score of "Quartette from Rigoletto" - Marked out portions to be emphasized as melody parts on recording.

Report from Walter Miller on recorders sent out as follows

#26 - Too Thin. Not as good as #67.
#25 - Explosive Squeak
#67 - Standard -

X

#67 - Standard
#23 - Muffled & Back
#24 - Too weak.

Got Leads #'s 34 & 35.

C 137J

Made over 3/4/15

Tested 3/4/15. Blasts on heavy chords with horn #9. Is too fuzz - tubby and muffled.

It is evident that this material is too thin & not quick enough of response.

Made over 3/4/15

Tested 3/4/15.

① - Holds piano with all horns and any way can be played. Excellent definition. Quality metallic.

② - Holds everything. Quality good. ~~Little weak.~~ Excellent definition.

③ - Holds everything. Quality good. Excellent definition.

3/4/15.

#34 - Special adjustable head as 3/20/15 with triangular rubber gaskets. With diaphragm of acetyl cellulose .001" from solution in $C_2H_2Cl_4$. Stretched by tightening screws of clamping ring. Has little resistance.

Set up with aluminum dome 5/8" x .006" - regular arm, Sapphire .038" x .125"

#35 - Special adjustable head as 3/20/15. with triangular sectioned rubber gaskets. With diaphragm of hard bronze .0025" thick. Stretched by tightening clamping rings. Is very tight & springy.

③ Same disc 5/8 x .006"

Made over 3/4/15

Set up ① regular arm - no dome or center piece. Sapphire .038" x .125".

② With disc of aluminum center 5/8" x .006" & same arm & sapphire as above.

[139]

8/4/15.
Set up and tested ~~#34~~, 35
with results as shown.

CURIOUS Tore up #34. Found
edges of .001 diaphragm where rubber
had been in contact - crushed.

#34 - Very sharp & tin-panny. Quality Rotten.

#34 - ① Head sounds well - somewhat sharp.

Test 3/6/15 - Sounds fine on all - Quality good - Excellent definition. Sound as #74. Little sharper

② Rifle more full

③ Becomes little more full

④ Becomes little more full

#35 - ① On first trial rotten found bad needle.

On second trial - good general quality but does not carry ring of notes - sounds dead.

② Improves up a little & becomes more natural.

Tests 3/6/15: Pretty - goes to pieces - too fine - heaviest in heavy chords.

3/4/15

#34 - Head same as before. Set up with diaphragm of brass .0015". Seems very tight. Regular arm. No dome. .038" x .125" Sapphire.

#34 - Head same as before. Set up with diaphragm of mica .0015". ①

① Stretched Tight

② Stretched not quite so tight

③ Loaded with wax

④ Loaded more wax

#35 - 3/5/15 -

Same Head as before.

Zinc Diaphragm .002". Rolled.

Regular arm & needle.

① Stretched medium tight

② " Tighter.

#36 - Quality good. Fairly loud. Ring fair. Nothing remarkable.

Test 8/6/15. Full - good hoods fair - quality excellent - rattles & blasts a little. (pulled together). Stopped at blasts & auto down volume little on soft playing.

8/5/15

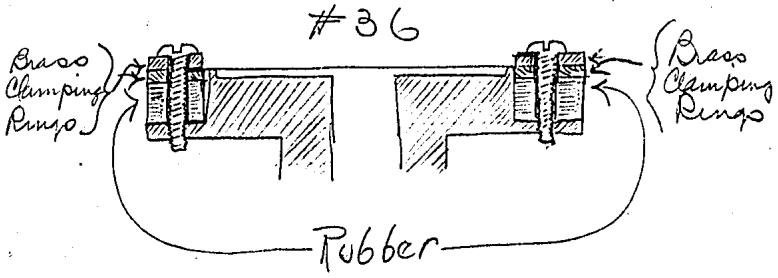
#36 Send inside as per sketch on following page to carry out Mr. E's idea of only metal touching vibrating diaphragm.

Diaphragm .0628" of acetyl cellulose from solution in $C_2H_2Cl_4$.

Regular arm & needle.

Dome 1/2" x .004" aluminum.

#36



3/5/15.

Set up and tested out #'s 35 & 36.
Found that #35 was rotten at first - weak and tin-panny. Mike showed a very poor needle. Changed needle and found results remarkably different. New needle showed excellent in Mike & entirely changed the record.

This emphasizes the attention which should be paid to the sapphires as it is evident that at least 50% of the record depends on this part of the recorder.

Quartette came except Mrs. Tates who has laryngitis. No work done except two short records made.

3/6/15.

Set up machine, underwater Tomlinson to help and tested out the following recorders

Cylinder #1

#3 Sharper than standard - Rather Dead - runs notes together.

#74 - Standard - full - natural - differentiate well.

Cylinder #2

#29 - Fair - runs low chords together - Quality fair.

#27 - Back in horn - muffled - weak & runs together.

#74 - Standard

Cylinder #3 -

#74 - Standard

#31 - Blasts (from neck arm touching back arm) Natural quality but back in horn. High notes, plunky.

#31 - (Neck Raise & pail to feed) - Blasts on lower notes

Cylinder #4

#2 - Blasts slightly on low chords & tune, Quality fair,

#12 - Blasts badly - Rotten - Tone way back in horn - Dead

#74 - Standard

Cylinder #5.

#74 - Standard

#32 - Needs tune - Tone a trifle sharper than 74 but good definition. Ringy.

#28 - Needs tune - fuller than 32 - does not ring quite so much but tone is natural though little plunky.

Cylinder #6

#33 - Holds fine on single notes. Blasts on low chords. Quality little plunky - fair.

#34 - Holds fine on all. Quality good. Excellent definition. As loud as #74. Little sharper than standard.

#74 - Standard.

Cylinder #7

#74 - Standard.

#35 - Rattley - good tone - too full - accentuates heavy bass notes. Blasts on low chords - Back in horn. Responds to C.

Cylinder #8

#74 - Standard

#36 - Full - good - holds fair. Quality excellent - Rattles & blasts notes a little.

① Some surface. Run few notes together. Quality excellent

② Not quite so much surface as ①! Smoothes out & all notes differentiated.

③ As 2 but trifle cleaner shellac.

Cylinder # 7

36 - (pulled tighter) This stopped the blast entirely but cuts down volume on light playing necessary to less sensitive.

Latin. Received 1/4" triangular rubber gasket head & set up using diaphragm of acetyl cellulose from solution in $C_2H_2Cl_4$ .0025" thick.

Set up:

① Regular arm - fairly large foot firm waxed to diaphragm.

② 1/2" dome aluminum .004". Regular arm etc.

③ Same as above but new arm sapphire -

3/8/15.

Had Finlayson fix stop on recording machine so that feeding slide arm would not knock off chain. Also put switch on recording machine for separate control of microscope lamp.

Tested out recorders with Geo. Werner & Hayes as follows -

Cylinder #1

#74 - Standard
#36 - Louder than standard - little thinner - cracks slightly.
#87 - Not as loud as 36 - little sharper than standard - little metallic.

Cylinder #2.

#74 - Standard.
#32 - Weaker than standard - cracks on high notes - back in horn - thinner than standard
#41 - Big full tone - loud - not as loud as 74 - very full little plunky - back in horn

[157]

Cylinder #3

#74 - Standard.

#34 - Not loud as standard. Tuck - not firm - rattles - little sharper than #74.

#4A - Not as loud as standard. Little back in horn. Quality very good

Cylinder #4.

#74

#41 - (Needle raised) Very fine - little back in horn - slightly muffled - good tone.

#28 ~~Fine~~ weak & slightly back in horn - fine but ~~not as~~ sweet as #74.

Got new 1/4" head. Set up with .0015" aluminum diaphragm. Tested. Metallic, sharp, unpleasant, tin panny, thin.

Set up 2" head (#83) with .0015" aluminum diaphragm - Same quality as above - Set up with .003" aluminum

diaphragm. Still too thin but better than usual, OOK!

[161]

- 3/9/15 -

Loaded up #37 with extra wax on the dome. This makes it fuller. It is louder than standard & seems to make the melody stand out more - think it does not carry the ring so long. Differentiates well.

Made up #38 - new 1¼" brass head with .002" mica & tried out. This is loud & differentiates well but rattles slightly.

#37-

Good & loud. Stands out of horn - trifle sharper than standard.

② Makes it fuller. Definition excellent. Just a trifle of rattle tone good. Quality good. Louder than standard. Stands out of horn fine. Geo. Werner says best (stretch) recorder he's heard

#38 - Louder than standard. Sensative. Stands out well but little sharp & rattles slightly.

Made and 3/10/15

② Makes little more full - Still not as natural as #37.

3/9/15

#37. Brass head 1¾" external, 1¼" int. diameters. Triangular section rubber gasket to stretch.
Set up with acetyl cellulose diaphragm from solution in $C_2H_2Cl_4$ - .0025".
Set up with aluminum dome 1/2" x .004" - regular arm & sapphire .038" x .125".

Sec 3/3/15

② Added extra weight on dome

#38 - Brass head - 1¾" external, 1¼" internal diameters. Triangular section rubber gasket to stretch.
Set up with mica diaphragm .002" thick.
Regular arm with large foot. Regular sapphire .038" x .125".

② Added extra weight on foot

#39 Loud, clear, firm, stands out well, quality little sharper than standard but comes out clear.

Made over 3/11/15.

#38 Tested 3/11/15. Says singing-

① "Loud but muffled & squeaks.

② (3/13/15) "Very like 41 – fuller & more sensaline than #74, little more sensaline than 41.

③ 3/13/15 – Louder & more sensaline than #74 – little sharper, blasts slightly on loud notes.

3/9/15

#39 - Brass head 1¾" external, 1½" internal diameters, triangular section rubber gaskets to stretch. Diaphragm of stock celluloid .0065" thick – screws just tightened – not stretched.
Regular arm with medium foot well waxed to diaphragm.
Sapphire .038" x .125".

3/10/15

#38 - Brass head - 1¾" external - 1½" int. diameters, triangular section rubber gaskets to stretch.
Diaphragm of acetyl cellulose from solution $C_2H_2Cl_4$, .0015" stretched rather tight.

① Regular arm with rather large foot well waxed to diaphragm.
Sapphire .038" x .125".

② Made over 3/12/15 with ½" x .006 flat aluminum disc & same needle arm.

③ Changed above to 3/4" x .006" aluminum disc. Same needle arm.

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Made over 9/13/15

#40 —

① Blasts - too full - blubbery.

② Very loud. Stands out of horn better or farther than any recorder I ever heard. Clear, distinct crisp - differentiation excellently. Is a little thin

③ Makes it full (very) & rattley

④ Cuts down volume & crispness & some of the sound out of the horn quality but makes it natural. Just a little sharp

⑤ Makes it a little more full.

⑤ Test 9/11/15 Hayes singing. Stands out fine. Loud. Clear. Crisp. Quality good. Little sharper than standard -

9/13/15 - Sharper than 74 - does not ring out to shows hammer blows.

9/10/15.

#40 - Brass head 1½" external, 1" internal diameters, triangular section rubber gaskets to stretch. Diaphragm of acetyl cellulose from solution C_2H_5OH - .0015" thick.

Made over 9/15:

① Regular arm with rather large foot, not stretched tight.

② Same stretched tight.

③ Added piece of solder wire to upright part of foot

④ Put on aluminum disc ½" x .006".

⑤ Added washers disc to increase weight

8/10/15.

Attended meeting with McCheaney & Pee about making Alex. Graham Bell picture.

Put up #'s 36 & 40 readers.
Recorded song of Miss Densen

Tested out #40 on Hayes.

Came back at night & made further tests on #40.

~~#39~~ Tester ~~3~~/11/15 -

① Piano and speaking.
Quality good but very weak

② - Hayes singing
Little louder than 1 - still weak.
Hayes says "weak & fair".

3/11/15.

#39 - Head Brass $1\frac{3}{4}$" ext. $1\frac{1}{4}$" internal diameters. With aluminum disc over open part of diaphragm as suggested by Mr Hutchison. Diaphragm of acetyl cellulose from $C_2H_2Cl_2$ - .003" thick. Regular .038 x .125" sapphire

① - With dome 1/2 x .006" - to vertical arm waxed to needle arm

② - Made up combined foot & vertical - waxed to needle arm.

3/11/15

Made up #39. Took it to depot. Tested out following:

Tester Hayes singing Stabat Mater in A♭.

① #40.
Stands out fine. Loud. Clear. Crisp. Quality good - little sharper than standard - Hayes says good -

② #39 - weak - quality good. looks swell.

③ #38 - Loud but muffled & squeaks

④ #74 - Standard.

⑤ #37 - Louder than standard Clear, crisp, stands out well - little sharper than standard. Should make commercial records.

Made over 3/15/15

#41 - Tested 3/13/15.
① Fuller more sensitive than #74. Shows piano hammer blow on string on striking note.
② - 3/13/15 - Less sensitive - clear does not show hammer blow of piano - does not rattle as ① - good quality.

#42 - Tested 3/13/15.
Not as loud as 74 - Little sharper. Needs better.

Made over 3/15/15.

3/12/15 (triangular rubber gasket)
#41 - Brass head - 1¾" external - 1¼" internal diameters. Diaphragm of acetyl cellulose from solution in $C_2H_2Cl_4$ - .002" thick.
① Set up with ½" x .006" aluminum disc at center, regular arm, sapphire .038" x .125".
② Set up with ¾ x .006" aluminum disc at center, regular arm. Sapphire .038 x .125"

3/13/15
#42 - Brass head - 1¾ ext - 1¼ internal diameters. Diaphragm of mica .001" thick.
Set up with ½" x .006" aluminum disc at center, regular arm, sapphire .038" x .125".

[179]

N

— 3/12/05 —

Put up recorder #41 -

Misses Ransom, Giles & Ingrid came & tried over "Quartetto from Rigoletto" Romano - lead.

Record I - #9 - 1min recorder (Go Herne) - Good - full - clear #105 - too pensative - rattles - back in horn

Record #2 - Good - balance fair - quality good - Keep only fairly together

Record #3 - not noticeably different except that soprano was flat twice but little more even usual -

Record #4 - 3min recorder #74 - recording & balance fine. Not very well together -

Rec #5 - Compare #37 & #74 recorders. #37 too pensative muffled - does not differentiate voice - Not commercial as hoped -

9/13/15

Negro quartette recorded.
Set up and tested #42

Tested Reeders with piano.
Tested reed #42 with #9 horn.
Found that it responded to
Ep'. Raised horn & this did
not occur. Changed to #7
horn & lowered. Did not occur.
Tested following reeders:

#42. Not as loud as 74 - heads
fine - little sharper

#40 - Sharper than 74 does not
ring: shows hammer
blows.

#37: More sensitive than #74
- blasts - full. but shuts
off notes

#38 - Very like 41 but little more
sensitive. Shows hammer
blows of piano, full.

C1833

#41 - Fuller & more sensitive than #74 - shows hammer blows of piano.

Made #41 up again taking off 1/2" disc & replacing with 3/4" "
Makes it feel much better - does not show hammer blow of piano but shows out more. Slightly fuller than #74.

#38 Put 3/4 x .006" disc on #38. Comes out good & loud, fuller than #74 - blasts a trifle on lower heavy notes.

#37 - Put 3/4" x .006" aluminum disc on this chandler. Is still more sensitive & louder than #74 though a trifle sharper. Blasts a little on lower notes.

#37 - Put on 7/8" x .006" aluminum disc. Loud, clear, free, good quality, little sharper than 74 but does not blast or show hammer blows of piano.

#37- Tested 3/13/15

① More sensative than #74 and louder. Triple sharper. Wasts just a trifle on loud notes. Stands out of horn better than 74.

② About as loud as 74- Stands out well. Just a trifle sharper & clearer. Holds better on all notes.

③ Voice good & loud close in. Can be heard at 5 ft. Very weak at 12 & 15-18 ft.

④ With Knitophone horn, fairly loud and distinct at 15-18 ft away.

④ Tested 3/17/15- Hayes singing- "Louder than standard. Triple sharper. Holds well. Piano good.

3/13/15

#37- Brass head- 1 3/4 external- 1 1/4 int. diameters. Triangular section rubber gaskets to stretch. Set up with acetyl cellulose diaphragm from solution $C_2H_5Cl_4$ - .0025".

① Set up with aluminum disc 3/4" x .006" - regular sapphire arm

② Set up with aluminum disc 7/8" x .006" - regular sapphire arm

③ Same as above

④ Same as above.

#40 Tester 3/13/15.

① - Loud - stands out fine but is sharper or more pinched than #74 or #37-②.

② Not as good as ① - Very much weaker - fringy notes - stands out fairly but notes not clear - rather thin & very pinched

③ Louder than ② but rattley - not good

3/13/15.

#40 - Brass Head - 1½" External, 1" Internal Diameters, triangular section rubber gaskets & celoth diaphragm. Diaphragm of acetyl cellulose from solution of $C_2H_3Cl_4$ -.0015" thick.

① Aluminum disc 5/8" x .006", regular arm & sapphire.

② Aluminum disc 5/8 x .004, regular arm & sapphire.

③ Lifts about disc on and added a concentric one 9/8" x .008" same arm & sapphire.

#41 Tested night 8/15/15 - Sharper than standard. Not as loud. Treble back in horn. Holds better.

*note test 8/17/15

#37 Little sharper than standard. Not quite as loud. Holds better. Not quite as sharp as #41.

*note test 8/17/15

#38 Has a fringe after notes. Little sharper than #14

*note test 8/17/15

#36 - Treble sharper than standard - Not quite as loud - Holds as well or better.

8/15/15 -

Wrote up report.

Finalized on getting 1 min part of recording machine to work

Set up Recorder #41

#41 - Brass head - 1 3/4 external, 1 1/2 int diameters - triangular section rubber gaskets. Diaphragm of acetyl cellulose from solution in $C_2H_2Cl_4$ - .002" thick.

① Set up with 7/8" x .0075" aluminum disc - regular arm & sapphire.

#37 - Same as 8/13/15

#38 Same as 8/10/15 except that 7/8" x .006" aluminum disc put on.

#36 - Same as 8/15/15 except that 1" x .006" aluminum disc waxed on center

Made cover for #39

C1913

3/17/15 (very sharp or thin - squeaky/ louder than standard, Piano sharp, screaming)

#42 - ① Louder than 7H - Just a little sharper - Does not hold quite as long - Little fuller than #38 - rattles just a trifle.

#38 - ① Louder on treble - not so loud on bass as 7H - Holds better - is a trifle thinner - differentiates notes fine - does not bleat or rattle.

② Not quite as loud as ① - takes away all tendency to rattle even out excellently. Still just a trifle thinner than standard. Will hold for further trials.

3/16/15 -

#42 - Brass head $1\frac{3}{4}$" Ext, $1\frac{1}{4}$" Int. Diameters, triangular section rubber gaskets to stretch. Diaphragm of aluminum .0015" thick, made very soft by heating & cooling rapidly.

① Regular arm with fairly large foot - .038" x .125" sapphire.

② Added 5/8" x .006" disc under elbow arm.

#38. Brass head - $1\frac{3}{4}$" ext, $1\frac{1}{4}$" int. diameters, triangular section rubber gaskets to stretch.

① Diaphragm of aluminum .0015" made very soft by heating & cooling rapidly. Regular arm with large foot - .038" x .125" sapphire.

② Added 1/2" x .004" aluminum dome under foot, otherwise same

C1935

3/16

3/16/17.

Saw Pound & Nelson about Graham Bell picture on the 27th. Part of morning and afternoon with them.

Made up Recorders #42 and #38.

Saw about getting good 1 min feed screw on recording machine. The feed screws used so far have mostly drunken threads so bad that this machine can not be used.-

Unable to test because recording machine was torn up.

Report on action of discs and domes on recorder.

3/17/14

See next Book

[ITEM(S) FOUND IN BOOK]

Mr Ry

Little encouragement

chalked pear drops.

Made a new one with diaphragm of white celluloid, .0055" purchased from The Celluloid Co. Plotted it by simultaneously freezing the head and warming the diaphragm & allowing both to come to normal temperature.

This gives a recorder which is too sharp and thin.

As this is exactly the reverse of previous reports where the pear drops were all too full & tubby it is encouraging in that we have both extremes and can try for a mean.

He can't get another diaphragm from Celluloid Co. 29

[ITEM(S) FOUND IN BOOK]

Perhaps the diaphragms I have made are from film used green, that is, not entirely cured or in which the solvent has not entirely dried out, which made them dead and not quick of response. Do you think it would be worth while to go out and attempt to purchase some various thickness of stock from the Celluloid Co and the Arlington Co. Such stock is probably better cured than that I cured make here.

Arnot Kennedy,

2/10/15.

[ITEM(S) FOUND IN BOOK]

(1) #4 - With Phones -

(2) #3 - Without "

(3) #2 - With Phones

(4) #1 - Without "

[ITEM(S) FOUND IN BOOK]

1 = 30
2 75
3 70 best pleasing
4 70

[ITEM(S) FOUND IN BOOK]

26 – too Chin notes good as #67

25 – explosive Squeek

67

67

23 – muffled + back

24 too Weak –

[ITEM(S) FOUND IN BOOK]

Fast Rose of Sharon #3
(Main #1)

#[illegible] – Set up Dinner place record here

#1 – Set up by Geo Morris. Fast Rose of S, #3
Rising Earth, #4
Tamarhaven #[illegible]

Dinner good on
[illegible] Hard [illegible] made up [illegible] Top
muffler [illegible]

– Set up [illegible] –

#[illegible] – Not Set up –

#[illegible] – Set up –

#[illegible] – Set up –